PROGRESS

OF

MEDICAL SCIENCE.

THERAPEUTICS.

UNDER THE CHARGE OF

FRANCIS H. WILLIAMS, M.D.,

ASSISTANT PROFESSOR OF THERAPEUTICS IN HARVARD UNIVERSITY.

KOCH'S TREATMENT OF TUBERCULOSIS.

THE researches of PROFESSOR KOCH will prove to be of such great importance that an outline of what has thus far been published may well be considered at this time. Since the announcement, at the International Medical Congress last summer, that he had found a remedy which conferred upon the animals experimented on an immunity against inoculation with the bacillus of tuberculosis, and which arrested tuberculous disease, Professor Koch gave out in November a most important communication, which was published in many medical journals and in the newspapers.

The composition of the proposed remedy has just been disclosed—a glycerin extract of the tubercle bacilli. The brownish, transparent liquid which is used does not require special care to prevent its decomposition. When it is used it must be dilued, and these diluted solutions should not be kept, as bacterial growths soon develop inthem, and they are then unfit for use.

Introduced into the stomach the remedy has no effect; it must be used subcutaneously, and every precaution must be taken to keep the syringe used perfectly clean. The most suitable site for the injection is the skin of the back between the shoulder-blades and the lumbar region. Here the injection leads to the least local reaction, and is almost painless.

The action of the remedy on man and on guinea-pigs is widely different Calculated by body-weight, one-fifteenth-thousandth part of the quantity which has no appreciable effect on the guinea-pig acts powerfully on the human being.

After injecting four minims into his own upper arm, Professor Koch had pain in the limbs, fatigue, inclination to cough, difficulty of breathing, three or four hours after the injection. These symptoms rapidly increased during the fifth hour, and were unusually violent. A chill followed, which lasted almost an hour, at the same time there were nausea, vomiting, and a rise of temperature to 103°. After twelve hours all of these symptoms abated; the temperature fell, and on the next day it was normal. A feeling of fatigue and pain in the limbs continued for a few days, and for the same period the site of the injection remained slightly painful and red. The smallest quantity of the remedy which will affect the healthy human being is about 0.14 minim (0.01 c.c.), or 1 c.c. of the one-hundredth dilution. This amount in most people causes slight pains in the limbs and transient fatigue. A few showed a rise of temperature to about 100.4°. The same holds good with regard to patients suffering from diseases other than tuberculosis; but the case is very different when the disease is tuberculosis, when such a dose, injected subcutaneously, causes a severe general reaction as well as a local one. The general reaction consists in an attack of fever, which usually begins with rigors, and raises the temperature above 102.2°, often to 104° and even 105.8°, accompanied by pain in the limbs, coughing, great fatigue, and often sickness and vomiting. In several cases a slight icteroid discoloration was observed, and occasionally an eruption like measles on the chest and neck. The attack usually begins four or five hours after the injection, and lasts from twelve to fifteen hours. Occasionally it begins later, and then runs its course with less intensity. The patients are very little affected by the attack, and as soon as it is over feel comparatively well.

The local reaction is best observed in cases in which the tuberculous affection is visible; for instance, in cases of lupus, changes take place which show the specific anti-tuberculous action of the remedy to a most surprising degree. A few hours after an injection into the skin of the back—that is, in a spot far removed from the diseased area on the face or elsewhere—the lupus begins to swell and to redden, and this it does generally before the initial rigor. During the fever the swelling and redness increase, and may finally reach a high degree, so that the lupus-tissue becomes brownish and necrotic in places where the growth was sharply defined. One sometimes found a much swollen and brownish spot surrounded by a whitish edge almost one centimetre wide, which again was surrounded by a broad band of bright red. After the subsidence of the fever the swelling of the lupus-tissue gradually decreases and disappears in about two or three days. The lupus-spots themselves are then covered by a soft deposit, which filters outward and dries in the air. The growth then changes to a crust, which falls off after two or three weeks, and which—sometimes after only one injection—leaves a clean, red cicatrix behind. Generally, however, several injections are required for the complete removal of the lupus-tissue. The changes described are exactly confined to the parts of the skin affected with lupus. Even the smallest nodules and those most deeply hidden in the lupus-tissue go through the process and become visible in consequence of the swelling and change in color, whilst the tissue itself in which the lupus-changes have entirely ceased remains unchanged. The observation of a case of lupus treated by the remedy is so instructive, and is necessarily so convincing, that those who wish to make a trial of the remedy should begin with a case of lupus.

The reaction of the internal organs, especially of the lungs, is not at once apparent, unless the increased cough and expectoration of consumptive patients, after the first injections, be considered as pointing to a local reaction in these cases; the general reaction is dominant, but we are justified in assuming that changes similar to those seen in lupus also take place. The remedy will form an indispensable aid to the diagnosis of tuberculous processes, and with its aid we shall be able to make a diagnosis in doubtful cases of phthisis where it is impossible to obtain certainty as to the nature of the disease by the discovery of bacilli or elastic fibres in the sputum, or by physical examination. Affections of the glands, latent tuberculosis of the bone, doubtful cases of tuberculosis of the skin, and similar cases, will be recognized. In cases of tuberculosis of the lungs or joints which have been apparently cured, we shall be able to make sure whether the disease has really finished its course, and whether there be still some diseased spots from which it might again arise as a flame from a spark hidden by ashes.

In lupus its action seems to be curative, but in what way it occurs cannot as yet be stated with certainty, as the necessary histological investigations are not complete. It is, however, certain that it does not destroy the tubercle bacilli in the tissues, but only that the tissue inclosing the tubercle bacilli is affected by the remedy. It can influence living tuberculous tissue only, and has no effect on dead tissue, as, for instance, necrotic cheesy masses, necrotic bones, etc., nor has it any effect on tissues made necrotic by the remedy itself. In such masses of dead tissue living tubercle bacilli may possibly still be present, and are either thrown off with the necrosed tissue, or may possibly enter the neighboring and still living tissue under certain circumstances in the therapeutic activity. If the remedy is to be rendered as fruitful as possible, the peculiarity in its mode of action must be carefully observed. At first the living tuberculous tissue must be caused to undergo necrosis, and then everything must be done to remove the dead tissue as soon as possible, as, for instance, by surgical interference. Where this is not possible, and where the organism is unassisted in throwing off the tissue slowly, the endangered living tissue must be protected from fresh incursions of the parasites by continuous application of the remedy.

The fact that the remedy makes tuberculous tissue necrotic and acts only on the living tissue, helps to explain another peculiar characteristic, namely, that it can be given in rapidly-increasing doses, in the course of three weeks to five hundred times the original amount. It is probable that in the beginning of the treatment there is a good deal of tuberculous living tissue, and that consequently a small amount of the active principle suffices to cause a strong reaction, but by each injection a certain amount of the tissue capable of reacting disappears, and then larger doses are necessary to produce the same amount of reaction as before. So soon as the point is reached at which reaction is as feeble as that of a non-tuberculous patient, then it may be assumed that all tuberculous tissue is destroyed. Then the treatment will only have to be continued by slowly-increasing doses and with interruptions, in order that the patient may be protected from fresh infections while bacilli are still present in the system; whether this conception and the inference drawn from it be correct the future must show.

In nearly every case of lupus the treatment was as follows: The full dose of 0.01 c. c. was injected, the reaction was allowed to come to an end, and then after a week or two the same amount was injected, continuing in the same way until the reaction became weaker and weaker, and finally ceased.

In two cases of facial lupus the lupus-spots were thus brought to complete cicatrization by three or four injections, the other lupus cases improved in proportion to the duration of the treatment; all of these patients had been sufferers for many years, having been previously treated unsuccessfully by various therapeutic methods.

Glandular, bone, and joint tuberculosis were similarly treated by large doses at long intervals. The result was the same as in the lupus cases, namely, a speedy cure in recent and slight cases; slow improvement in severe cases.

With phthisical subjects, who made up the largest number of the patients, the conditions were somewhat different. Those with decided pulmonary tuberculosis are much more sensitive to the remedy than those with surgical tuberculous affections. For them it was found necessary to diminish the dose, as they almost all reacted strongly to 0.002 or even 0.001 cubic centimetre; from this small dose it was possible to rise more or less quickly to the amount that is well borne by other patients.

An injection of 0.001 c. c. was first given to the phthisical patient, and from this a rise of temperature followed; the same dose was repeated once a day until no reaction could be observed. This dose was then increased to 0.002 c. c. until this was borne without reaction, and so on, increasing by 0.001 or at most 0.002 to 0.005 c. c. This mild course seemed to be imperative in cases in which there was great debility. By this mode of treatment the patient can be brought to tolerate large doses of the remedy with scarcely a rise of temperature. But patients of greater strength were treated from the first partly with large doses and partly with frequently-repeated doses. Here it seemed that the beneficial results were more quickly obtained.

The action of the remedy in cases of phthisis generally showed itself as follows: Cough and expectoration were generally increased a little after the first injection, then grew less and less, and in the most favorable cases entirely disappeared. The expectoration lost its purulent character and became mucous. As a rule, the number of bacilli decreased only when the expectoration began to present a mucous appearance. They then entirely disappeared, but were again observed occasionally until expectoration completely ceased. Simultaneously the night-sweats ceased, the patient's appearance improved, and he increased in weight within from four to six weeks.

Patients under treatment for the first stage of phthisis were freed from every symptom of disease and might be pronounced cured; patients with cavities not yet too highly developed improved considerably and were almost cured, and only in those whose lungs contained many large cavities could no improvement be shown. Objectively, even in these cases the expectoration decreased and the subjective condition improved. These experiences lead one to suppose that phthisis, in the beginning, can be cured with certainty by this remedy. This statement requires limitation, in so far as at present no conclusive experiences can possibly be brought forward to prove whether the cure is lasting.

Relapses may occur, but it can be assumed that they may be cured as easily and quickly as the first attack; it is possible that patients once cured may retain their immunity. Patients with large cavities will probably obtain lasting benefit only in exceptional cases. Possibly some of these severely-afflicted patients may be relieved by a combination of this new therapeutic method with surgical operation, such as the operation for empyæma. The treatment will probably be quite simple in cases in which the beginning of phthisis and simple surgical cases are concerned, but in all other forms of tuberculosis medical art must have full sway by careful individualization and making use of all other auxiliary methods to assist the action of the remedy.

In many cases the decided impression was created that the careful nursing bestowed on the patient had considerable influence on the result of the treatment, and Professor Koch is in favor of applying the remedy in proper sanataria, as opposed to treatment at home and in the out-patient room. How far the methods of treatment already recognized as curative, such as mountain climate, fresh air, special diet, etc., may be profitably combined with the new treatment cannot yet be definitely stated, but Professor Koch believes that these therapeutic methods will also be highly advantageous when combined with the new treatment.

The most important point to be observed in the new treatment is its early application. The proper subjects for treatment are patients in the initial stage of phthisis.

In the Charité Hospital in Berlin, Professor Fräntzel and Dr. Runkwitz have carried out Koch's treatment systematically, since September 13th, with Dr. Pfuhl's assistance. The new remedy was tried chiefly upon patients with phthisis, and, for purposes of comparison, upon patients whose lungs were healthy. Upon the healthy class small doses caused no reaction, but large ones were followed by a temperature of 102.2°, rigors, pains in the limbs, and exhaustion. In one case symptoms were caused which suggested the possibility of latent tuberculosis. The phthisical cases were of two classes, those in which the disease had made much progress, and those in which the progress was less marked. In four cases of the first class the progress of the disease was not stopped, in two of the cases no signs of healing were found after death. In eight cases, when the progress of the disease was less marked, the results were more satisfactory. One will suffice to suggest the general character of these cases.

A locksmith, twenty-one years old, of healthy family. In 1889, had swollen and discharging glands in the neck. Since May, expectoration and cough; from September 30th until October 3d, the expectoration was bloody. A tall man, of average development, with a flat thorax. Dulness in front on the right side to the second rib, behind dulness in the right supra-spinous fossa. Numerous râles over the right lung. The abundant bloody expectoration contained bacilli No. 6, counted according to Gaffky's method. Left lung free. After thirty-five days of treatment, the dulness on the right side was still to be recognized, râles few in number, but only found after coughing. No more blood expectorated; expectoration less and vitreous in character. No more night-sweats. Bacilli disappeared. Increase in weight one and a quarter pounds.

In the lighter forms of the disease the bacilli disappear for the time at least. The physical signs improve, the secretion is less, fever disappears, night-sweats cease, the cough is reduced to a minimum, the appetite is good, and the body increases in weight. Obviously the method is one which will be of most service when applied early in the disease, and where there is not a large amount of material to be disposed of. For the conditions in the lung are not so simple as in lupus, for example, where the infiltrated tissue is readily thrown off. In the lungs the tuberculous tissue is killed, but it remains in the lungs, perhaps imbedded in cheesy material; in any case its expectoration is often very difficult. When these masses of tissue remain in the lungs they are a source of danger and a menace to the patient's life, for they contain bacteria which will renew their attack upon the system so soon as the treatment is stopped. This accounts for the fact that some patients who had ceased to react to the remedy, again reacted after an interval during which the treatment had been suspended. It will, therefore, be necessary to have patients under treatment for some time, and afterward at intervals test their immunity from a reaction to Koch's remedy.

In the out-patient department of the Charité Hospital in Berlin, Dr. Köhler and Dr. Westphal treated twelve cases of tuberculosis, including lupus and tuberculous affections of joints. The patients received injections of a one-per-cent. dilution of the remedy, beginning with a 1.6 ♏ (0.1 c. c.), which in some cases was gradually increased to 16 ♏ (1 c. c.). The syringe should be disinfected with absolute alcohol after each injection. The technique of the injection does not differ from that of giving an ordinary subcutaneous injection. As a rule, the injection is almost painless, and is accompanied by only slight local reaction. The usual general symptoms came on about six hours after the injection. From the time of the injection until the chill the patient had no discomfort, but with the chill there were headache, pains in the limbs and in the back, which disappeared as a rule on the next day. Some of the patients had with the chill considerable pain in the stomach and vomiting; with others these symptoms came on near evening, when the temperature was at its height, and disappeared with its subsidence.

While all tuberculous patients do not react in the same manner to the remedy, it is true that tuberculous patients are more susceptible to the action than non-tuberculous patients, the same dose being given in both cases. Most tuberculous patients have a chill after six hours, followed by fever, sometimes with a temperature up to 104°, which usually became normal within twenty-four hours. The pulse was increased during the fever up to 130–140 per minute. In some cases an exanthematous eruption, in others icterus, was observed.

The local appearances are most striking in lupus; in one patient who had lupus nasi a feeling of warmth, burning, and tension came on in two hours after the injection; three hours later the face was red; after five hours the parts affected had reached their maximum condition of swelling and redness. The swelling and redness were not limited to the diseased parts, but included neighboring parts. The affected parts, nose and upper lip, were also covered with an exudation in the form of yellow drops and crusts. Though the swelling and redness did not increase until the next day, the scabs were more numerous and thicker. The exudation did not appear to continue more than forty-eight hours. After two days the redness and swelling of the diseased spots and their vicinity began to diminish, and was limited, after five days, to the affected places, and even these became much paler in the following three weeks.

Five days after the injection the scabs began to crumble, and on the ninth day could be removed easily. The nose was found to be no longer swollen, but smooth and pale-red over most of its surface, and was covered, as the other affected parts, with a delicate cicatrix. On the alæ nasi and their borders, as well as the nostrils, there were pale granulations, which were again covered with a scab within a few days, and they had fully cicatrized on the twenty-fourth day. On the fifteenth day there appeared on the smooth surface of the nose numerous soft red prominences about the size of a pin's head, often with a small blister, between them there remained the pale-red new cicatrix. The number of these small knobs and blisters increased to the day of the next injection. The injections were repeated after the twenty-seventh day three times, with intervals of two and one day. After each injection there appeared on that day swelling, redness, and exudation, but not with such intensity as after the first injection.

The total amount injected into this patient was a drachm of the one-per-cent. solution. In four cases patients who had old scars or wounds were chosen because they had no signs of tuberculosis, and to test the reaction of the remedy in such cases. No local changes in the wounds or scars were observed, but it was found that the remedy can cause general symptoms in non-tuberculous patients.—*Deutsche medicinische Wochenschrift*, November 4, December, 1890.

At the instance of Professor Gerhardt Dr. Hertel treated eighteen cases who had tuberculous affections of the larynx. The one-per-cent. solution, preserved with one-half per cent. of carbolic acid, was employed. At the site of the injection there was no special irritation.

In fourteen cases bacilli were found in the expectoration; in three others the tuberculous nature of the laryngeal disease was confirmed by the presence of lupus or physical signs in the lungs. In one the injection was made as a test.

The cases included four groups: First, those in whom, before the treatment, no signs of disease of the larynx were visible, but which became apparent after the injections. Second, patients who had what seemed to be disease of a tuberculous nature in the larynx, and which changed its appearance under the treatment. Third, such as suffered from undoubted tuberculous disease of the larynx; and fourth, two patients who had scarcely any general reaction from the remedy, and no local reaction in the larynx.

The experience of the few weeks' observation of these cases is as follows: The treatment renders the diseased spots more conspicuous. After a few milligrammes ($\frac{1}{64}$ grain) there appears, after a longer or shorter interval, a local reaction, sometimes accompanied by a general reaction, and sometimes without. The local reaction consists of a reddening and swelling of the diseased tissues, which changes its color in about twenty-four hours. Later a funnel-shaped ulcer forms in the middle of the diseased tissue. The diseased tissue shrinks, while there is greater or less discharge of mucus and liquid. Up to November 27th time enough for a cure had not elapsed, but the improvement has been continuous.

V. BERGMANN, by permission of Dr. Koch, presented patients, and described the treatment received by them in his clinic.

The cases treated are divided into four classes:

1. Thirteen cases of tuberculosis of the skin, including tuberculosis of the pharynx.
2. Four cases of tuberculosis of the lymph glands of the neck.
3. Sixteen cases of tuberculosis of the joints and bones.
4. Four cases of tuberculosis of the larynx.

The difficulty of differentiating between carcinoma and tuberculosis will be obviated by Koch's remedy, and the diagnosis will be positive. A better illustration of its value in this respect can scarcely be found than is afforded by these cases.

They demonstrate the fact that the subcutaneous application of Koch's remedy in those organs attacked by the tubercle bacillus, viz., the skin, mucous membrane, lymph glands, joints, and bones, produces changes which are manifest in the swelling, reddening, increase of sensibility, and disturbed functions. These phenomena do not occur in other than tuberculous tissues—such as syphilis and carcinoma—or in healthy individuals. There is no remedy which produces an action analogous to this. This fact alone is enough to arouse the greatest interest, and to render it of great therapeutical value. Through the medium of the blood the diseased spot is influenced in a visible and positive manner. The local action is associated with a high fever, producing a rapid rise of temperature, rapid pulse, icterous discoloration of the skin, headache, nausea, vomiting, pains in the limbs, exhaustion, weakness. These are the first effects of Koch's remedy.

These cases undoubtedly show, especially the patients with lupus and a child with coxitis, that the tuberculous tissues degenerate under the influence of the remedy.

The tuberculous ulcer on the alveolar process and hard palate is in process of cicatrization, one of the lupus cases is almost entirely cured, and the second case, Wachter, has lost most of the nodules, and her improvement is evident. The coxitis of Ziegelsdorf of a few weeks' duration has lost its sensitiveness, increased mobility, the swelling is hardly perceptible, and the formerly-flexed leg has been straightened without producing pain.

From all accounts the remedy should be used only in small (1 mg., $\frac{1}{64}$ ♏) doses where there is much tuberculous tissue present, and only when the site of the disease is external, or when after using small doses it is found desirable to increase the dose, should large ones be employed (in children ½ mg. or $\frac{1}{128}$ ♏).

For use, one part of the remedy may be diluted with 99 parts of ½ per cent. carbolic acid solution. One cubic centimetre of this solution would contain 0.010 or ten doses of 1 mg. each. This may again be diluted by taking one part of it and adding 9 parts of water, which would give (one part of the original liquid in 1000 of solution) 1 mg. in each cubic centimetre—a cubic centimetre is equivalent to ♏ xvj, or exactly ♏ xvj = 0.99 c. c. The injections are usually made by means of a special syringe which can be easily kept clean by washing in absolute alcohol and rinsing in water, though subcutaneous syringes of the ordinary pattern, but with asbestos packing in the piston, have been used.

[For the treatment of lupus and for purposes of diagnosis the remedy will probably be of value; in the treatment of tubercular diseases of the joints, in connection with surgical treatment, it seems likely to have a field of usefulness. Where the process has made little progress in the respiratory organs, there is reason to hope that we are to have a remedy better than anything thus far known, but great numbers of patients in advanced stages of consumption will be sadly disappointed.

In the treatment of tuberculous disease in animals it will probably lead to the saving of large sums, and as a prophylactic save human life by diminishing the chances of the spread of the disease to man.

Much criticism has been made about the delay in publishing the secret; but it is probably difficult to make the remedy of uniform strength and quality. The fluid is a violent poison, and carelessly-made preparations would soon bring the whole method into disrepute.

Professor Koch may feel well satisfied, not only with the results of his investigations thus far, but with the manner in which his statements have been received, for there is no one whose word commands more fully the confidence of the entire profession. Let the profession remember that the situation in which Professor Koch finds himself may be full of embarrassment, and before assuming that he has personally any ulterior motive for having withheld the secret of the preparation of his remedy, it is right to consider that in Germany his relations to his government may be such, and may since last summer have been such, as to compel him to do as he would not; in other words, his hand may have been forced from the beginning. Let us accord to Professor Koch none other than the highest, most generous, and humane motives.]

New Methods of Treating Erysipelas.

Rosenbach's method consists in washing not only the erysipelatous patch, but the entire neighboring surface, with soap and then bathing daily these patches with five-per-cent. solution of phenic acid dissolved in absolute alcohol. Very brilliant results are claimed to follow this method, both as regards the course of the disease and the febrile phenomena. Even absolute alcohol is said to produce a favorable action.

In Nolte's method the entire affected surface and surrounding zone are painted twice daily with a mucilage of gum-arabic containing from three to five per cent. of phenic acid.

The method of Koch consists in applying, by means of a camel's-hair pencil, the following ointment in a thin layer over the affected parts:

Creolin	1 part.
Iodoform	4 parts.
Lanolin	10 "

After the ointment is applied it is covered with a thin layer of gutta-percha. This method is said to be especially applicable to erysipelas of the face and of the hairy scalp.

In the method of treatment of Nussbaum and Brumm ichthyol is employed in collodion.

Hallopeau recommends the use of a solution of 1 part to 20 of salicylate of sodium. Thick cloths are wet with this solution, then applied to the affected parts, and then covered with a layer of rubber cloth so as to prevent evaporation. Almost immediate relief is obtained, and a cure is said to follow on the third to the fifth day.

Hunter recommends the injection of carbolic acid into the healthy skin at a distance from the part infected. This method of treatment is extremely painful, and is only applicable in severe cases of the face or hairy scalp.

Dr. Kraske advises making an incision in the healthy skin around the erysipelatous patch before applying the antiseptic substance.

Wölfler makes use of mechanical compression by bandages applied so as to circumscribe the inflamed tissue, while Dr. Kraske proposes elastic rubber bands to accomplish the same effect, where these are applicable.—*Therapeutic Gazette*, No. 10, 1890.

WHOOPING-COUGH.

Bromoform	gtt. x.
Alcohol	ʒj.
Distilled water	℥iij.
Syrup	ʒiij.—M.

Sig.—One or two teaspoonfuls daily.

—*Revue de Thérapeutique*, No. 17, 1890.

SALOL COLLODION.

It is recommended to dissolve four parts of salol in four parts of ether, and then add it to thirty parts of collodion.

It is said that the application of the salol collodion to the affected parts in acute rheumatism will be followed by rapid relief of pain.—*Therapeutic Gazette*, No. 8, 1890.

[If collodion is applied to a joint it is well not to have it go completely around the limb, as collodion contracts strongly on drying, and might cause too much constriction.—ED.]

DEATH FROM A LARGE DOSE OF PARALDEHYDE.

Bridget O'B., twenty years old, was admitted to the fever hospital attached to the Cork Workhouse, suffering from typhoid fever. Through an oversight on the part of the attendant, she was probably given six or seven drachms of paraldehyde. In about five minutes she fell into an unconscious state, and, despite medical assistance, she died some hours later.—*Lancet*, August 20, 1890.

ARISTOL.

1. Aristol has been used in a pure state in sclerosis and other ulcerations in the male and female genitals. After washing the ulcers with carbolic or sublimate water, the aristol was powdered on and covered with gauze. In ulcers on the glans penis it is necessary to remove the bandage frequently on account of priapism; in these cases iodoform has the advantage over

aristol. In syphilitic and indolent ulcers or chancres the latter acts exceedingly well. Great cleanliness is necessary, especially about the female genitals. In fresh cases aristol has no advantages over iodoform.

2. Aristol was made use of with the best results in acute otitis media and otorrhœa in place of boracic acid, in lupus laryngis, laryngorrhœa, in ulcerations of the penis, and ulcers of the leg. In burns aristol (with oil or lanolin 10 per cent.) relieved pain, and caused rapid cure.

Aristol possesses the advantages of iodoform, and can even be used in children, with whom iodoform must be used carefully.

Aristol has not a penetrating odor like iodoform.

MEDICINE.

UNDER THE CHARGE OF

J. P. CROZER GRIFFITH, M.D.,

PHYSICIAN TO ST. AGNES AND THE HOWARD HOSPITALS, AND ASSISTANT PHYSICIAN TO THE HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA.

THE PRINCIPLES OF THE TREATMENT OF DIABETES MELLITUS.

PAVY (*International Med. Congress*, 1890), referring to the nature of diabetes, says that it is with the carbohydrate principles that the faulty action lies. These, instead of being consumed and utilized, remain and are eliminated as carbohydrates. This is true, whether the carbohydrates are introduced in the food, or whether they are formed by the splitting-up of nitrogenous matters within the body.

With regard to the presence of sugar in ordinary urine, the author made a series of observations some years ago in which he definitely proved that it existed there in small quantities. He also found it normally present in the blood. A further series of observations made upon the blood of seven cases of diabetes showed that the amount of sugar in it was very greatly increased, and that there was a general agreement between the amount here and that escaping in the urine. The conclusion is, therefore, justified that the larger the secretion of sugar in the urine the worse in every direction is the condition of the patient suffering from diabetes; since the unnatural state of the blood cannot but induce a deviation from healthy action throughout the system.

The question arises as to the source of this abnormality of the blood. The long experience of the author, and the experiments carried out by him, convince him that it is due to sugar reaching the general circulation in a manner it ought not. In the normal condition the ingested carbohydrates are restrained by the liver from entering the general circulation. The author has proved this to be the case by analyzing the blood in the portal vein and that in the general circulation, and showing that a large preponderance of sugar is encountered in the former, if examined after the ingestion of carbohydrate matter. It is necessary, however, to bear in mind that this sugar here found